

REMARKS

Status of Claims

Prior to this amendment, claims 1 to 11 were pending in the application. Claims 1, 3, 4, 5, 9, 10, and 11 are amended herein. Claim 2 is cancelled from this application. Therefore, after entry of the foregoing claim amendments, claims 1 and 3-11 will be pending and under examination. No new subject matter has been added by the claim amendments, and allowance of the pending claims is respectfully requested.

Rejection under 35 U.S.C 103(a)

The Examiner rejected claims 1-11 as being unpatentable over U.S. Patent No. 5,699,121 to Zakhor in view of U.S. Patent Publication No. 2002/0114393 to Vleeschouwer. The rejections are respectfully traversed and reconsideration is requested. The following is a comparison between embodiments of the present invention and the cited art.

Independent claim 1, for example, as amended herein recites decomposing said residual image into a list of one or more atoms, each atom representing a basis function from the overcomplete library, decomposing said residual image comprising identifying a replacement region in the residual image for representation by an atom using a residual energy segmentation; creating a subset of basis functions from the overcomplete library, each basis function in the subset matching with the replacement region within a predetermined threshold; identifying an atom within the subset of basis functions using progressive elimination, said atom for representing the replacement region and said atom having parameters; quantizing said atom and modifying the parameters of the atom into a form suited for encoding; encoding said quantized atom, subtracting said atom from the replacement region in the residual image to reduce the energy of the residual image and using a quadtree-based atom coder to reduce the size of the residual image; and when a reduced size of the residual image or a reduced energy of the residual image does not achieve a predetermined criteria; further identifying a replacement region, creating the subset of basis functions, identifying an atom within the subset of basis functions, quantizing said atom, and encoding said quantized atom.

U.S. Patent No. 5,699,121 to Zakhor discloses a method of compressing a video signal using a matching pursuits algorithm. The method includes deriving a frame of a motion residual signal from a frame of the video signal, identifying a selected input pattern within the motion residual signal, comparing the selected input pattern to library patterns of a pattern library to identify a matched pattern, and identifying the highest energy pattern within the frame of the motion residual signal. The highest energy pattern is then compared to a library of patterns in a pattern library to identify a matched pattern. A set of variables (so called atom parameter signal segments) are then assigned to characterize the matched pattern. These atom parameter signal segments are then combined to form an atom parameter signal, which is transmitted as a compressed video signal corresponding to the video signal.

Zakhor does not teach or suggest a method for encoding a residual image using basis functions from an overcomplete library that includes decomposing said residual image into a list of one or more atoms, each atom representing a basis function from the overcomplete library, decomposing comprising identifying a replacement region in the residual image for representation by an atom using residual energy segmentation, as recited in present claim 1. Instead, Zakhor discloses method of compressing a video signal using a matching pursuits algorithm, in which a selected input pattern within a motion residual signal is identified by dividing the motion residual signal into seek blocks, computing the sum of square of all pixel intensities for each seek block, and adopting the seek block with the largest value as the selected input pattern (see column 5, lines 29-39).

Furthermore, Zakhor does not teach or suggest a method for encoding a residual image using basis functions from an overcomplete library that includes identifying an atom within the subset of basis functions using progressive elimination, said atom for representing the replacement region and said atom having parameters, as set forth in amended independent claim 1. Instead, Zakhor discloses a method of compressing a video signal using a matching pursuits algorithm, in which the highest energy pattern is compared to a library of patterns in a pattern library to identify a matched pattern by comparing all basis candidates at all possible positions to find the closest

matching basis function. In contrast, amended independent claim 1 uses a progressive elimination algorithm to identify an atom within the subset of basis functions.

Zakhor therefore does not teach or suggest a method for encoding a residual image using basis functions from an overcomplete library, as recited in amended independent claim 1.

U.S. Patent Publication No. 2002/0114393 to Vleeschouwer fails to cure the deficiencies of Zakhor. Vleeschouwer discloses a method of encoding a sequence of video frames that includes at least two sub-encoding steps. The method includes dividing at least a part of a current frame of the sequence of video frames into blocks and then performing a first sub-encoding step on the block. A second sub-encoding step is then performed on the first sub-encoded block. The second encoding step is optimized by adapting the encoding parameters based on a quantity of the first sub-encoded part of the current frame. The quantity is determined by a prediction from a reference frame. Vleeschouwer further discloses that the second sub-encoding step can be based on a matching pursuit algorithm.

Vleeschouwer does not teach or suggest a method for encoding a residual image using basis functions from an overcomplete library that includes identifying a replacement region in the residual image for representation by an atom using residual energy segmentation and identifying an atom within the subset of basis functions using progressive elimination, said atom for representing the replacement region and said atom having parameters, as set forth in amended independent claim 1. Instead, Vleeschouwer discloses a method of encoding a sequence of video frames that uses block segmentation and a sub-encoding method that can be based on a matching pursuit algorithm.

Therefore, it is submitted that neither Zakhor nor Vleeschouwer, alone or in combination, teaches or suggests a method for encoding a residual image using basis functions from an overcomplete library that includes identifying a replacement region in the residual image for representation by an atom using residual energy segmentation and identifying an atom within the subset of basis functions using progressive elimination, said atom for representing the replacement region and said atom having parameters, as recited in independent claim 1.

Therefore, the Applicants respectfully submit that amended independent claim 1 is patentable over Zakhor in view of Vleeschouwer.

Amended independent claims 10 and 11 include similar features as to those described above with respect to amended independent claim 1, and therefore the Applicants submit that amended independent claims 10 and 11 are patentable for at least the same reasons independent claim 1 is patentable.

The dependent claims include at least all the features of amended independent claim 1 and therefore the Applicants submit that the dependent claims are patentable over Zakhor in view of Vleeschouwer for at least the same reasons amended independent claim 1 is patentable.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 329092000600. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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